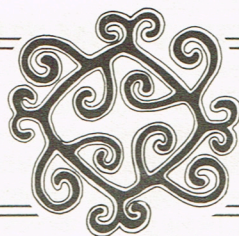


Plant



Wise

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THE WORLD TREE



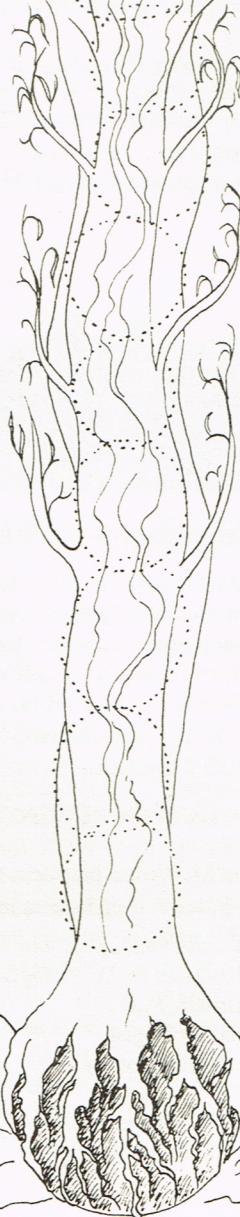
At the center of the perfect world, there grows a tree that reaches so high, so strong, and so true that it climbs up through the sky to another realm, then through that realm to another, and another and another . . . The tree's branches grow in tiers, reaching out from each node into the four directions, each holding aloft one of infinitely numbered heavens through which one ascends after death. Form and energy spring from this tree. Each branch is made up of many small trees. Each leaf breathes in and out through a thousand tiny windows every moment. The trunk is a fountain of life, drawing it all in, sending it all out, quietly, quietly. The roots reach deep into the earth, asking, and the earth holds on, answering.

This is the myth of the Maya, and a reflection of the view of many peoples throughout world history as they explain the levels of spirit and reality in terms modelled by nature. The World Tree is a universal motif with both a symbolic and a botanical representative in each culture. The mythic structure it provides most likely predates the sacred identity of individual species.

Some cultures develop elaborate philosophical cosmologies from this primary motif of the World Tree (the Kabala in Hebrew tradition), even adapting it into new forms (the ladder, the cross, the maypole). Others read the natural visual form it offers more intuitively. All have stories that are deep references to the archetypal impulse of life and growth that reaches up in our collective and individual centers. In paying attention to a tree, we respect its knowing strength, its longevity, the fact that so much unfolds from so little: the seed of the tree.

"The great tree stood there firmly like a noble Thought, which if understood would save the world."

John Stewart Collis



Ceiba pentandra

The Maya call it *Yaxche*, Tree of Abundance. Elsewhere it is known as kapok or silk-cotton, or by any of dozens of illustrative folk names. It is a member of the Bombacaceae family and is the largest tree in Central and South America, growing to 250 ft. The ceiba provides wood for canoes, its flange-like buttresses are used for doors in Mexico and it shades many town squares. The bark is used for a variety of medicinal purposes in different localities. The best known product is the kapok itself, a cottony floss that accompanies the seeds in the black, oblong seed capsules. This floss consists of hollow, waterproof hairs, excellent for insulation, and the stuffing of bedding, pillows, and upholstery.

In Peru, where it is known as *lupuna blanca*, it is credited with white energy, balancing the force of *puculupuna* (*Cavanillesia hylogeiton*), or 'old lupuna', a great tree of dark energy. In Chiapas, Mexico, the story goes that the native people sprang from the roots of the ceiba. In the Guianas, the creator formed all things from the silk-cotton tree, except for white people, who came from another tree, with different roots.

We have *Ceiba pentandra*, a specimen collected from Peru, growing on the trail-side in Hawaii, at the center of the land, where it is shooting up at an astonishing rate. Our motivation for collecting and nurturing it is to have the World Tree there as a guardian, as a ladder to the sky, because all these plants--medicinal, visionary and otherwise--live in a mythical dimension as well as in a world of soil, water, light and purpose.

A truly huge ceiba rises at the entrance to the ruins of Tikal, in Guatemala, and one can't help but notice that the lowest rung of branches is so incredibly high off the ground that no human could ever climb it, which is probably as it should be. KHM

A LETTER FROM THE EDITOR

Plant People: the phrase says it all, a wedding of the two levels of organism. I first encountered the term many years ago in Hawaii, where it is common parlance. Someone would say, "You should meet her, she's a real plant person." Or, "They're plant people; you'd have a lot in common." A plant person is someone who has recognized the plant world on a heart level, allowed themselves to take in the details of the flora, the relationships, the diversity, the significance, a person immersed in awareness of plants. They usually can't help but collect seeds and plants in daily life; clippers always in the glove compartment, taking pride in the new leaf on a recent cutting.

Plants are the primary thing that make the planet happy, says a friend. They feed its soil and air, balance the chemistry, do the dance of life and death eon after eon on a grand scale, far more grand than we are consciously able to assimilate. Plants are that vast part of life that lives and dies, gives and takes, but doesn't walk around. The wind, water and animals keep moving, transmitting the seeds. As people, we collect the plants, propagate them, trade them, breed them, wax passionate about them, make myths and live in them. Now we have reached the stage of plant/human relationship when we try to preserve them from the sweep of our own history.

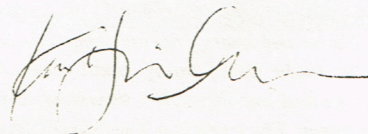
Are we saving plants for us, or for them? Our motivations for plant preservation range from human utility through environmental necessity to the protection of something simply because it is beautiful, and because it exists. Every branching of the tree of genetic self-expression is of value and worth carrying forward into the story of the planet, regardless of its usefulness.

I recently met a couple of hundred plant people, at the annual Seeds of Change conference in Santa Fe, New Mexico. The attendees, from all over North America, are activists on the behalf of plants. The two themes were biodiversity and bioremediation (detoxifying and returning health to an environment through the conscientious introduction of other organisms). Some of the folks save and propagate the seeds of heritage food-crops, or specialize in Native American cultivars. Others work with teas, aromas, traditional medicines, sustainable agriculture, indigenous cultures. They all seem to be engaged in the multifaceted work of preserving the plants. Often they proceed with little funding, no personal profit, but always with passion.

Plant people are storytellers too. Stories they tell are encoded in the plant genetics, living in the folk names, in a recipe, in the tale of how the collector came to the seed, or how the seed sought out the collector. Stories of cross-pollenization, how a disappearing strain was found to be surviving only in the garden plot of one old plant person. Species that are remembered but now gone, strains that are being developed for the future from rare seeds that are messengers from the past.

There is a joy in recognizing another plant person, a sturdy optimism in doing this kind of work. It is not all leaning against the dark; tuning in to the plants is like being in love with the planet. The gifts are mutual.

Kathleen Harrison McKenna
Project Director, Botanical Dimensions



WHAT IS BOTANICAL DIMENSIONS ?

Botanical Dimensions is a non-profit 501(c)3 organization, founded in 1985, dedicated to collecting living plants and surviving plant lore from cultures practicing folk medicine in the tropics worldwide. Ethnobotany is the study of plants used by people: for food, fiber, building and medicine. Ethnomedical plants are those used to prevent and cure illness, to maintain well-being of the body, mind and spirit. Because the medicinal plants are endangered, we support live plant and seed collection efforts in Central and South America, Africa and Asia. We maintain an extensive botanical garden in Hawaii, propagating the living collection for research and genetic diversity. In California, we coordinate educational outreach, keep a plant database, fundraise, and publish this newsletter, **PlantWise**.

The shamanic tradition of plant medicine is as fragile as the rainforest itself.

THE HUMAN DIMENSION

Botanical Dimensions was founded by Kathleen Harrison McKenna, president, and Terence McKenna, secretary. We are joined on our board by many fine individuals who share our deep interest in plants and the quality of human life.

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ethnobotanist
Dennis J. McKenna, Ph.D.,
research director,
ethnopharmacologist



Excerpt and illustration from *The Healing Forest*:

Duroia hirsuta (P. et E.) K.Schumann, Martius, Fl. Bras. 6, pt. 6 (1889) 367. owekawe (Waorani): sha-ka-ker-ná-sê (Kofán); taro-quiullo, solimán (Col.)
DY 966; GS 612

The Waorani rub the pheromones of the ants living in the swollen parts of the stem on the inside of the cheeks "to relieve pain of too much use of the blowgun," or when ulcers of the mouth prevent the use of the blowgun. The bark is employed by the Indians of the Putumayo to bind on the arms for cicatrization. It contains a principle which blisters the skin, leaving a brown or black stain lasting several months (Schultes, 1969, 1987).

It is common belief among the Amazonian Indians of Colombia that the roots of this tree exude a "poison" fatal to most other plants. Where it forms colonies of 20 or more individuals, the usually dense forest is free of undergrowth; only *Selaginella* and a few ferns will grow under it. The reason for the lack of vegetation in the vicinity of this plant may have some connection with the presence of the ants in the swollen internodes of the tree. This problem, apparently, has never been investigated (Schultes, 1987).

The Healing Forest: Medicinal and Toxic Plants of Northwest Amazonia.

Richard Evans Schultes and Robert F. Raffauf. 1990. Hardcover, 484 pp., 136 b&w illustrations/photos.

Dioscorides Press, 9999 S.W. Wilshire, Portland, OR 97225, \$62.95 postpaid.

Reviewed by Dennis J. McKenna, Ph.D., Ethnopharmacologist and BD's Research Director

Every once in awhile there comes along a book which, although primarily addressed to specialists, is so elegant in its presentation and so timely in its subject-matter, that its appeal and significance extend far beyond the relatively narrow audience for which it was originally intended. Such a circumstance pertains to the book under review here, the result of years of collaboration between Harvard ethnobotanist Richard Evans Schultes and phytochemist Robert F. Raffauf of Northeastern University. R. E. Schultes, for many years Director of the Botanical Museum and Professor of Biology at Harvard, has spent the better part of a long and productive scientific life documenting the medicinal, economic and ritual uses of plants by indigenous peoples. Robert Raffauf also claims international stature in his chosen field of phytochemistry, where he is well-known for his work on alkaloids. Now these men, in compiling *The Healing Forest*, have bequeathed an important legacy, both to their many students and to the world at large.

The book documents the uses of more than 1500 plant species by the aboriginal peoples of the Northwest Amazon Basin. Schultes knows this region intimately as a result of spending much of his career collecting in that part of the Amazon, which has perhaps the highest species-diversity on the planet. Schultes' documentation of the diverse uses made of so many species in the region by the aboriginal inhabitants (the emphasis is on medicinal uses but extends beyond that; e.g., fish poisons, curares, and insecticides are all extensively documented) dramatically validates the notion that within these primeval woods the miracle drugs of the future, tomorrow's cure for cancer or AIDS, may well be awaiting discovery. Schultes and Raffauf, by compiling this book in a way that is accessible and useful to specialists and nonspecialists alike, have more than done their part to foster their discovery. There is enough

information here on potentially useful but uninvestigated Amazonian plants to keep several generations of ethnobotanists and phytochemists busy for decades.

The lengthy preface by Schultes offers an appropriate lead-in to the ethnobotanical material, providing the reader with a succinct but informative overview of the geology, floristics, geography, and ethnography of the Northwest Amazon Basin. The main portion of the book is logically organized by family, beginning with Acanthaceae and ending with Zingiberaceae. The sections pertaining to each family are well-organized and detailed, containing complete taxonomic citations, and information on the botany, native names, and chemical constituents of the families and the genera and species within them which have ethnobotanical uses in the Northwest Amazon. The usefulness and logical organization of the botanical information is enormously enhanced by the presence of an Index to Diseases, Treatments and Symptoms. This index, organized by symptomatic categories and subcategories, enables the reader to quickly access all the references to the diverse uses of these plants, ranging from hallucinogens to treatments for earwax.

The book is well-illustrated with botanical illustrations of exceptional quality, and black-and-white photographs showing the aboriginal preparation and use of some of the described plants. The cover illustration by the Peruvian painter and *vegetalista* Pablo Amaringo beautifully adheres to this theme by depicting the traditional method of manufacturing curare. There is a wealth of ethnomedical wisdom to be found between these covers, and it is to be hoped that this book will be discovered, cherished, perused thoroughly, and consulted often by all those with a serious interest in plant medicine, ethnobotany and tropical resources.

UÑA DE GATO (*Uncaria* species): A MEDICINAL PLANT WITH A RICH CHEMISTRY AND MULTIPLE ETHNOMEDICAL USES

Dennis J. McKenna, Ph.D.

Since the recent re-publication of Nicole Maxwell's book on plant-collecting, *Witch Doctor's Apprentice*, we have received many inquiries from readers of *PlantWise* about *Uña de Gato*, one of the primary remedies which is discussed in that book.

Like *Sangre de Drago*, which is also profiled in this issue of *PlantWise*, *Uña de Gato* is one of the most widely used and highly prized of the Amazonian medicinal flora. The term, which means "cat's claw", is applied to either *Uncaria tomentosa* or *Uncaria guianensis*, and refers to the claw-like spines of hooks present at the leaf nodes. These climbing, lianaceous shrubs display an epiphytic growth habit, and these structures serve to anchor the plant to a supporting tree.

The genus *Uncaria* belongs to the large Rubiaceae family, which also includes the coffee plant, the *Cinchona* tree, source of the antimalarial drug quinine, and many other biologically active medicinal species. There are approximately 30 to 60 species in the genus, having global, pan-tropical distribution. One species, *Uncaria gambir*, is a commercial source of tannin. A Chinese species, *Uncaria sinensis*, is valued in Chinese medicine as a muscle relaxant; it is also used for the treatment of hypertension, dizziness, cerebral arteriosclerosis and convulsions. In Amazonian ethnomedicine, both *U. tomentosa* and *U. guianensis* are used as tonics, sedatives, analgesics and for the treatment of tumors.

Schultes, in his book *The Healing Forest* (reviewed in this issue of *PlantWise*), reports that the Indians of the Rio Apaporis use a tea of the leaves *U. guianensis* to treat dysentery. Our informant and collector in Peru, Francisco Montes, has found *U. tomentosa* to be an effective treatment for the diarrhea and vomiting which are among the acute symptoms of cholera (see "Uña de Gato and Cholera"). This latter observation, if confirmed, may have important implications for the indigenous inhabitants of the cholera-infested regions of South America, since most of the fatalities from this disease result from the dehydration and loss of fluid which occur within the first 24-48 hours of onset. Those who cannot obtain access to conventional medical treatment, either because they

cannot afford it or because they cannot travel to a clinic, may be able to control the acute symptoms through the use of *Uña de Gato*.

Uña de Gato, Uncaria guianensis
Rubiaceae



by Paul E. Nace
from *Witch Doctor's Apprentice*

The chemistry and pharmacology of *Uncaria* species has been relatively well investigated, and the traditional uses of the plant are well-supported by scientific evidence. The biologically active compounds which have been most thoroughly investigated are complex oxindole alkaloids, such as rhynchophylline, pteropodine, mitraphylline, speciophylline, corynantheine and hirsutine; as their names imply, these alkaloids are also found in other biodynamic members of the Rubiaceae, notably *Corynanthe yohimbe*, source of yohimbine, and *Mitragyna speciosa*, source of mitragynine. The indole alkaloids of *Uncaria* species have been studied for their biological activity, and have been shown to exhibit a spectrum of cardiovascular effects, including hypotensive, antihypertensive, vasodilatory, and anti-arrhythmic activities. In addition, these alkaloids bind to brain receptors for the neurotransmitter serotonin, which may relate to their anti-nauseant and anti-diarrheal effects. There is also evidence that some of the alkaloids may display a morphine-like action at opiate receptors, which could provide an addi-

tional rationale for their use in the treatment of dysentery and diarrhea. Some of the indole alkaloids are known to be cytotoxic to tumor cells; interestingly, however, these same alkaloids have recently been demonstrated to act as potent stimulators of the immune system at extremely low concentrations, and in fact, U.S. patents for some of the alkaloids displaying this activity have recently been filed. A small Florida-based herbal products company (Amazon Herbs Co. 725 North A1A Street, Suite C-115, Jupiter, FL 33477), has recently begun marketing an alcohol tincture made from the bark of *Uña de Gato*, for use as a natural immune stimulant. Either the cytotoxicity or the immune-stimulating effect could explain the reputation of *Uña de Gato* as a tonic or anti-cancer plant.

The other major class of biologically active compounds in *Uncaria* species are known as quinovic acid derivatives. These triterpene glycosides have also been identified in *Cinchona* species and *Mitragyna* species, but those from *Uncaria* have been recently isolated, and their pharmacological activities have been much less thoroughly characterized compared to the alkaloids. They do possess antiinflammatory activity and also have some degree of antiviral activity against some strains of viruses in the test tube.

In summary, *Uña de Gato* serves as yet another example of a highly biodynamic plant with a rich and widespread tradition of ethnomedical use in diverse cultures. Further information on this interesting genus can be found in the references listed below.

"Plant Metabolites, New Compounds, and Anti-Inflammatory Activity of *Uncaria Tomentosa*." *Journal of Natural Products* 54(2). 1991. 453-459.

"Plant Metabolites Structure and In-Vitro Antiviral Activity of Quinovic Acid Glycosides from *Uncaria Tomentosa* and *Guettarda Platypoda*." *Journal of Natural Products* 52(4). 1989. 679-685.

"The Alkaloids of *Uncaria Tomentosa* and their Phagocytosis-Increasing Effect." *Plant Medica* (5). 1985. 419-423.

"Alkaloids of *Uncaria Guianensis*." *Plant Medica* 47(4). 1983. 244-245.

FROM THE FIELD

by Rob Montgomery

Rob Montgomery conducts ethnopharmacology courses for the Botanical Preservation Corps. (P.O. Box 1368, Sebastopol, CA 95472). This is a portion of an interview I conducted with him regarding the trip he and Bret Blosser undertook into the forests of Eastern Ecuador in late 1990.---KHM

KHM: You say the indigenous people there are fairly acculturated but live very rurally? Does this mean they have transistor radios and wear western clothes?

RM: Yes, some of them that live along the roads, and in the towns available by roads, are indistinguishable from colonists, but they are pure Quechua or members of one of the different lowland subgroups. In fact when I was there a couple of years ago, I didn't really know that all these people around me were not colonists, but Indians who were walking around in a completely different world, mentally and conceptually.

KHM: You have said these people use *ayahuasca* [a hallucinogenic plant brew] in groups; do you mean community or family groups?

RM: Only in extended family groups. Every family knows how to make it.

KHM: Who specifically prepares and administers it?

RM: Well, the wife prepares and takes it. And the husband takes it and does the singing, whistling and leaf shaking.

KHM: They drink it together?

RM: Yes.

KHM: And are there grandparents there? I mean are these larger family kinship structures? Do they all take it together?

RM: Often the wife doesn't take it. She watches her husband in case something happens which he needs help with.

KHM: Does the wife collect the plant material?

RM: When we went into the yard of this one family we visited, the wife was the one that cut the stuff and gave it to us. Rocio Alarcon [An Ecuadorian anthropologist] made the comment that the women know much more about plants than the men because they are the ones that prepare it, so they are more hands-on familiar with it. There are even female yachags [Quechua for shaman - KHM] but it's not usual for a woman to become an ayahuasquera. [A person trained to heal with ayahuasca. - KHM]

KHM: In this region of Ecuador, do all ayahuasqueros act as healers?

RM: There is a big distinction between yachags and curanderos. The curanderos use medicinal plants for healing diseases, but the yachags don't do that. Some yachags are also curanderos, but generally they deal strictly with supernatural illness. When a curandero can't help somebody, or if there's something wrong with somebody that isn't an illness, they'll go to the yachag.

KHM: For what kind of problem?

RM: A problem like *susto*, which means "bad air", something that gets you. During the ayahuasca experience they will call you up and suck this stuff out of you. Afterwards they cough it out, making these horrible wrenching sounds as they bring it from way down inside themselves until they get it in their hands and pour it away from themselves. It's not "real", but you can see by the way they are handling it, they know what they're doing. When a yachag is sucking an area that needs to be cleansed, he can gag on it. If he doesn't get it in his mouth and then get rid of it by whisking it away, blowing it out and rinsing his mouth, he might swallow it and that's really bad.

KHM: The equivalent for us of taking a huge dose of someone else's "germs"?

RM: Yes; if that happens he has to seek help from his wife.

KHM: Can they offer you protection from something like *susto*?

RM: Yes, sometimes they open up your head and transfer this force from themselves they call "bones". Afterwards they seal you up by blowing a blast of vaporized moonshine alcohol on your head and whisking you with tobacco smoke. Yachags consistently elaborate the dangers of somebody "getting you". They are always debating the dangers of rivalry and the possibility of different people getting to you, which makes it important to take measures to protect yourself.

KHM: Are all yachags worried about protecting themselves?

RM: No, some of them are really good and powerful and they seem invulnerable. There was this one old man we met, who told us that when he was five it was recognized that he was going to be an accomplished yachag, so his father or grandfather started blowing power into him. He started taking ayahuasca at ten, and by the time he was fifteen he was better at being a yachag than anybody in his day. He was sixty-five when we met him, which meant he had been a master for fifty years, doing ayahuasca several times a week. He was so good that he didn't care about the danger from others. When we asked him a question about all this rivalry and danger and darts, he just said, "I don't have to worry about that, I know how to deal with all that. Nobody can get me."

KHM: His protective aura was in place.

RM: Yes.

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UÑA DE GATO AND CHOLERA

A Letter from Francisco Montes

I have translated an excerpt of a letter dated 10-14-91 from our Peruvian collector, Francisco Montes, because it illustrates experimental folk medicine at work. The dual crisis of cholera and the economy have propelled the search for inexpensive, effective medication, so they look to the plants.

Señora Kat:

We have found a plant that is very good for defending oneself from cholera. Its folk name is *Uña de Gato*. Its scientific name is *Uncaria tomentosa*. One uses the water that rises inside the stem. Just drink the water of the stem and this has the property of eliminating the vomiting and diarrhea with which this epidemic attacks.

I will try to send this plant for you to make a respective study, because this plant has been proven by the *indigenas* and all of us that are working to protect ourselves with this plant.

*(We have a thriving specimen of *Uncaria guianensis*, also called *Uña de Gato*, in Hawaii at this time. — KHM)*

UPHILL DOWNHILL

by Kathleen Harrison McKenna

Well, there's been a lot of uphill since the last issue of *PlantWise*, a long year ago. Life on this path is sometimes rocky, and the newsletter may have been very occasional (thanks for your patience), but the project is doing well.

Our deepest gratitude and acknowledgements to all of you who responded so generously to the plea for money last January. BD was facing a \$52,000 balloon payment on the land in Hawaii, due in April. We were able to meet it by raising \$36,000 in donations and a no-strings loan of \$16,000. Extra thanks go to Peter and Mimi Buckley, Laurance Rockefeller, Robert Barnhart and Carolyn Kleefeld. The plants now have as permanent a home as we can give them. Thus far in 1991 we have also gratefully received grants from the Rex Foundation and the Hunt Foundation. A fundraiser in Los Angeles gathered \$5500, thanks largely to the volunteer efforts of Steven Marshank.

Work has proceeded on the Macintosh database, mostly developed by my brother, artist and Hypercard consultant Chris Harrison. It provides a good shell that is slowly being filled, but I am now in need of a really accomplished student of botany who can do literature research, edit and enter into the database, is familiar with a Mac, can assist with correspondence regarding plants, able to live in Northern California, and work closely with me, all for a moderate salary. I am also in need of another Mac, preferably an SE or better, so that two of us can work at the same time. Any extras out there?

PlantWise now has 750 subscribers, and has distributed at least a thousand copies of each issue at events. Back issues, which are increasingly popular, are available for a \$5 contribution each.

One of our directors, Nicole Maxwell, had a close call in the spring. She is in her eighties, big-hearted and tough, but perhaps not as tough as she used to be when she plant-collected and lived in the Amazon for forty years. She is now recuperating from a physical collapse and living in Florida, very short on funds and needing support. If you would like to help her out, send checks to: Nicole Maxwell, c/o John Easterling, 725 North A1A St., Suite C-115, Jupiter FL 33477. You can also help by buying and reading her fine book, *The Witch Doctor's Apprentice*, republished by Citadel Press in 1990.

In September, I attended the annual Seeds of Change conference, described in my Letter from the Editor, and found it most gratifying.

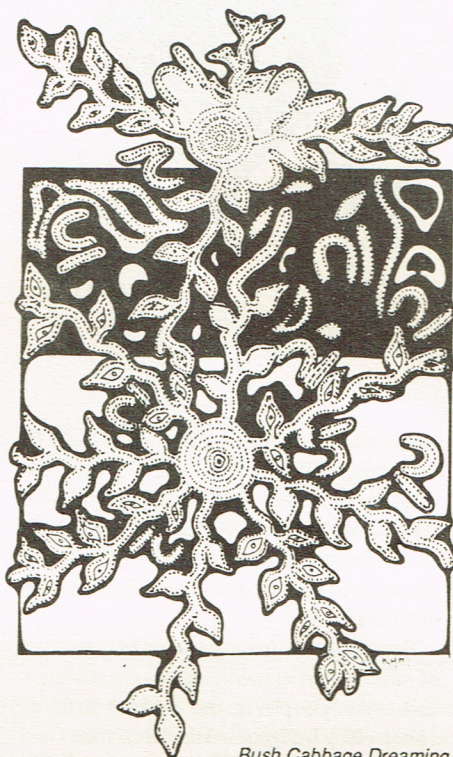
For information on their efforts and next year's conference, write to Ken Ausubel, Director, 621 Old Santa Fe Trail #10, Santa Fe NM 87501. Outstanding features at the gathering were Alan Kapular's portrait of the *plant kingdom*, a term which illustrates an interactive network rather than a hierarchy, and Gabriel Howearth's description of their vast seed-saving farm in Gila, NM. These three fellows are the remarkable directors of Seeds of Change.

Native Seeds/SEARCH (2509 N. Campbell Ave. #325, Tucson AZ 85719) was represented there by Kevin Dahl, who edits the *Seedhead News*, an excellent newsletter on their valuable work with Southwest and Sonoran native food crops. Recently they have taken on the cause of fighting deforestation and development in the Sierra Madre of Northern Mexico. The species diversity is remarkably rich there, and Tarahumara people, among others, have a rich but fragile relationship to both wild and cultivated species. The "forestry development" project, a shortsighted effort to loan money to a needy economy in trade for its irreplaceable resources, is being funded by the World Bank. A free-trade agreement with Mexico would bring more funds on board for greater environmental devastation.

I visited the Sierra Madre last November, hiking and seed-collecting with my father in the icy highlands and tropical canyons, observing again the delicate balance indigenous people achieve with the gifts and limitations of their natural world. The Tarahumaran style is very beautiful, and their future perilous.

We continue to receive seeds from our collector Francisco Montes in the Peruvian Amazon. The crew of *Jardin Sachamama* (the botanical garden he founded) came very down with cholera, but survived. Despite the difficult times in Peru now, Francisco continues to collect plants, sending me herbarium specimens: dried and pressed leaves, flowers and seeds with collection information, folk name, use, and sometimes Latin name. These will help us to identify the plants and seeds he is collecting, as well as add data to the record regarding folk use.

The garden in Hawaii is doing well, subject this summer to terrible wild boar attacks (no kidding), but ably defended by caretaker Ken Haven. Finn McKenna (age 13) and I visited in July for the stunning total eclipse, spending time with the plants and the many remarkable plant people who are our neighbors there. Another working trip coming up soon. — KHM



Bush Cabbage Dreaming
Drawing by KHM, from Australian Aboriginal painting



Drawing by Finn McKenna

PlantWise #4

The Way of Heaven is to benefit and
not to harm.

The Way of the true person is to
assist without striving in the
unfolding of the story of the
Earth.

Tao Te Ching, translated by Tolbert McCarroll



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SANGRE DE DRAGO (*Croton lechleri*)

by Rob Montgomery

Sangre de Drago ("Dragons' Blood"*, also called *Sangre de Grado* in many areas) is a medicinal blood-like latex tapped by indigenous people, in the manner of rubber, from a tree found in the rainforests of the Upper Amazon.

The source of this valuable healing agent is *Croton lechleri*, a tree belonging to the family Euphorbiaceae that grows up to fifty feet in height. Its heart-shaped leaves have raised veins with two glands at their base that change color with age from deep green to yellow/orange and red. This characteristic of yellow and red foliage throughout its crown is an aid in field identification, even at great distances. Being dioecious, the male flower spikes are borne on separate trees from the female tree, which fruits with a two-seeded capsule. The bark is grey and smooth when young, acquiring a furrowed thickness as it matures. Large specimens, with trunks measuring over five feet in diameter, can be found in remote and intact primary forests.

Ranging widely across the Northwest Amazon drainage, *Croton lechleri* is encountered at elevations between 1,200' and 4,500' in the wet foothill forests. It is also found on the other side of the Andes, in the Pacific rainforests of northern Ecuador. This indicates a much wider distribution across South America prior to the Andean orogeny, when the tectonic uplift that changed the course of the Amazon from west (joined originally with the African Niger River) to east, created an inland sea, and isolated a small *refugia* of rainforest along the extreme northwest coast. Several related species of *Croton* which also yield a similar latex are found from Mexico to Bolivia.

In many regions where the tree is found, it is placed among the most valued medicines in the local native peoples' forest pharmacy. The 'blood' tapped from the trunk and branches has a broad spectrum of uses, most of which are corroborated independently from tribe to tribe. It is applied externally to cuts to stop bleeding and accelerate healing, to disinfect wounds and skin infections while forming a protective, flexible 'liquid bandage' when dried. It is also used as a



mouthwash for bleeding and ulcerations of the gums, tooth infections and to protect the teeth from cavities (the native people who showed us this had impeccable teeth). A swab of cotton soaked in *sangre de drago* is placed in a painful cavity to kill the pain and disinfect it.

The *sangre de drago* has now become part of modern herbal medicine among colonists and urban people in the Andean nations, collected by indigenous rainforest tribes and eventually sold in cities and markets. It has acquired quite a reputation among practitioners as a miracle cure—all. In addition to the wound healing and dental uses, it is also drunk. A few drops in water is used as a cure for an astonishing number of disease states, including stomach ulcers, anemia, hepatitis, cirrhosis of the liver, leukemia, cancers of the stomach, uterus, lung and prostate, and for post-partum bleeding. Our personal experiences, using it frequently for cuts as well as both internally and externally for staph infections, have been dramatic.

The chemistry of *sangre de drago* has been studied and found to be complex and pharmacologically active. The whole latex tests active against *Staphylococcus aureus*, several viruses, and induced tumors. Other species of *Croton*, although not *C. lechleri* at present, have been found to contain phorbol esters (implicated in carcinogenesis)

suggesting caution in internal use. One of its main alkaloids, *taspine*, has proven to have a potent and safe anti-inflammatory action. Its folk uses are backed up by its clinical profile as an antimicrobial disinfectant, accelerating wound-healing while providing a flexible protective seal.

Tapping of *Croton lechleri* is normally done by indigenous people who seek out wild trees. It has never been cultivated aside from a few specimens in botanical gardens. Because of a growing population of colonists and a steadily rising market value for *sangre de drago*, harvesting is a thriving cottage industry among displaced, poor colonists who lack the tradition of respect for the forest and her plants. In the course of studying this tree and its product, we have documented disturbing evidence of its increasingly threatened status as a primary forest species. Traditional, but slow and low-yield tapping is giving way to felling whole trees in order to more easily take all of its life blood for quick cash. Too often we have stepped over felled gigantic, ancient trees of *Croton lechleri* on trails even days' walk from any human settlement. Clearly the growing demand for *sangre de drago* has put yet another pressure on wild habitats.

There are ways to harvest this product sustainably without destroying virgin rainforest trees. Limbing and even selective cutting of *Croton lechleri* trees can be done in secondary forest and roadside areas where it often grows abundantly. A group of our conservation-minded indigenous friends have been surveying the occurrence and density of the trees found in abandoned pastures and logged-over secondary forest as a component of a broader strategy of native management of areas as extractive reserves. It is hoped this will offset the threat of over-collecting in the primary rainforest, while increasing the supply of low-cost effective healing agents, providing local communities with a potential market income and bypassing the often exploitive, overpriced pharmaceutical industry.

The interest being shown by western pharmaceutical firms may be a mixed

continued next page

blessing. Valuable facts about the chemistry and therapeutics of *sangre de drago* may result, however the pattern is for patented, refined forms of folk remedies to be exported back to third world countries at unaffordable prices. Beyond the socioeconomic issues, there exists the very real problem that large orders for *sangre de drago* placed by foreign firms could go through the hands of unscrupulous brokers and ultimately result in over collecting and felling of remaining trees.

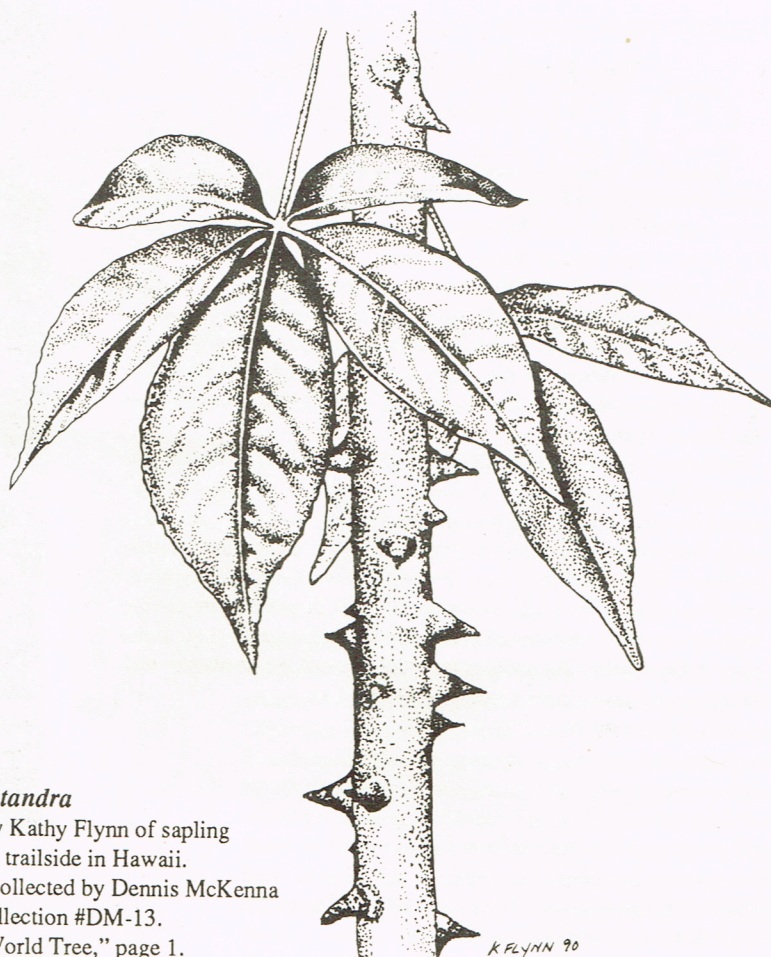
We refrain from deforestation at this situation, since a positive response is gaining momentum. A model collaboration linking indigenous people with a forest-friendly *sangre de drago* production has already been initiated and sample material of native-gathered *sangre de drago* is being made available to establish a market base in North America.

[Half-ounce bottles of *sangre de drago* may be purchased for \$5 postpaid from 'of the jungle', Box 1801, Sebastopol CA 95473. — KHM]

* There is another herbal product called "Dragon's Blood," which is a solid, chunky pitch from the *Dracaena draco* tree, an Old World species unrelated botanically and medicinally, with which South American *Sangre de Drago* should not be confused.

Ceiba pentandra

Drawing by Kathy Flynn of sapling growing on trailside in Hawaii. Specimen collected by Dennis McKenna in Peru. Collection #DM-13. See "The World Tree," page 1.



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The Earth on Turtle's Back

a Native American myth

Before the earth there was only water that stretched as far as anyone could see. Far above there was a skyland, in which grew a great and beautiful tree. Its roots reached in the four directions and it gave out every sort of flower and fruit.

The wife of the chief of this ancient skyland had a dream that the great tree should be uprooted. Honoring his wife, the next day the chief ordered his men to uproot it, but they could not and so the chief himself did it. Where the tree had been there was a giant hole, and as the wife leaned over to look in, she fell, only clutching some seeds and leaves as she went.

Far below some swans saw the wife falling, and flew up and caught her with their wings. Since the woman could not adapt to the watery world the animals lived in, they decided to dive down and get some earth from the bottom, but no one could do it except the humble muskrat. The muskrat swam down and swiped at the bottom, grasping some of the earth. When he came up, he put the earth on the back of the turtle, and almost immediately the tiny earth grew to the size of this world. As soon as the wife planted the seeds she had brought, trees and plants sprang up everywhere.

Life had begun on earth.



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